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(21) Application number: **07103894**

(22) Date of filing: **27.04.95**

(71) Applicant: **TOYOTA MOTOR
CORPCATALER KOGYO KK**

(72) Inventor: **TAKADA TOSHIHIRO
IIDA SEIZO
TAKEI HISASHI**

**(54) METAL CARRIER FOR EXHAUST GAS
PURIFYING CATALYST**

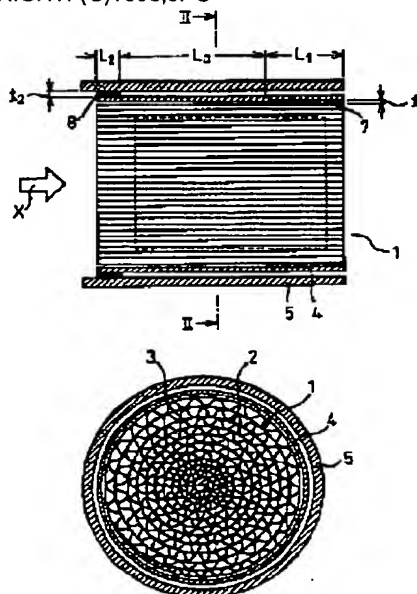
(57) Abstract:

PURPOSE: To prevent generation of cracks on a honeycomb body and improve the durability of a metal carrier by making the brazing material amount per unit area of a brazing section between an intermediate cylinder and the honeycomb body less than the brazing material amount per unit area between the intermediate section and an outer cylinder.

CONSTITUTION: A cylindrical honeycomb body 1 is formed by rolled concentrically and alternately a metal flat sheet 2 and a metal corrugated sheet 3 and the outer periphery of the honeycomb body 1 is covered with a metal intermediate cylinder 4, while the outer periphery of the intermediate cylinder 4 is covered with a metal carrier cylinder 5, and a catalyst is carried on the honeycomb body 1. Then the flat sheet 2 is brazed with the corrugated sheet 3 only on the upstream and downstream ends of the honeycomb body 1 when viewed from the flowing direction X of exhaust gas and the outer periphery of the honeycomb body 1. The axial direction length L_1 of a brazing material layer 7 is made longer than the axial direction length L_2 of a brazing material layer 8, and the thickness t_1 of the brazing material layer 7 is made thinner than the thickness t_2 of

the brazing material layer 8 to make the brazing material amount per unit area of the brazing material layer 7 less than that of the brazing material layer 8.

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Übersetzung
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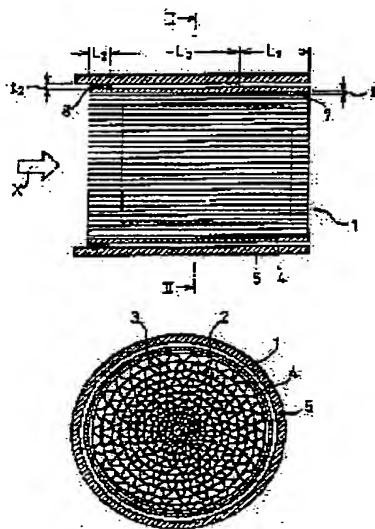
TAKADA TOSHIHIRO
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(54) METAL CARRIER FOR EXHAUST GAS PURIFYING CATALYST

(57)Abstract:

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CLAIMS

[Claim(s)]

[Claim 1] The honeycomb field of the shape of a cylinder acquired by ****ing a metal plate and a metal corrugated plate by turns in the shape of a said core, A wrap sheath is provided [the periphery of the honeycomb field] for the periphery of a wrap interval cylinder and an interval cylinder. While the soldering junction of the inner **** of an interval cylinder is carried out in the end section of an interval cylinder in the periphery side of the honeycomb field, in the other edges of an interval cylinder, the soldering junction of the periphery side of an interval cylinder is carried out at inner **** of a sheath. In the metal support for exhaust gas depuration catalysts which supported the catalyst on the honeycomb field Metal support for exhaust gas depuration catalysts made curse between an interval cylinder and the honeycomb field, curse the amount of wax material per [in a joint] unit area between an interval cylinder and a sheath, and fewer than the amount of wax material per [in a joint] unit area.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the metal support for exhaust gas depuration catalysts.

[0002]

[Description of the Prior Art] The honeycomb field of the shape of a cylinder acquired by ****ing a metal plate and a metal corrugated plate by turns in the shape of a said core, A wrap sheath is provided [the periphery of the honeycomb field] for the periphery of a wrap interval cylinder and an interval cylinder. While the soldering junction of the inner **** of an interval cylinder is carried out in the end section of an interval cylinder in the periphery side of the honeycomb field, in the other edges of an interval cylinder, the soldering junction of the periphery side of an interval cylinder is carried out at inner **** of a sheath. The metal support for exhaust gas depuration catalysts which supported the catalyst on the honeycomb field is well-known (refer to JP,5-57197,A). In this metal support, it is made to prevent that an interval cylinder deforms and absorb change of the path of the honeycomb field when the path of the honeycomb field changes with a thermal-expansion operation and deflation operations, and prevent that big stress occurs locally on the honeycomb field by that cause, and a crack occurs on the honeycomb field.

[0003]

[Problem(s) to be Solved by the Invention] However, the honeycomb field receives a chemical change by wax material, and it is based [***** based on the ground for physical big stress will occur on structure and] also on the ground for chemical a crack occurs as a result that a crack occurs on the honeycomb field. That is, if an interval cylinder and the honeycomb field are heated to an elevated temperature in order to carry out the soldering junction of between an interval cylinder and the honeycomb field, nickel nickel in wax material will be spread in the plate which constitutes the honeycomb field, and a corrugated plate. However, if a lot of nickel nickel is spread in a plate and a corrugated plate at this time, a plate and a corrugated plate will carry out an embrittlement, and, as a result, it will become easy to generate a crack. Moreover, if a lot of nickel nickel is spread in a plate and a corrugated plate, the coefficient of thermal expansion of the monotonous fraction which nickel nickel diffused, and a corrugated plate fraction will become large locally, and a big level difference will come to arise in the amount of thermal expansion between a monotonous fraction besides the result, and a corrugated plate fraction. Thus, if a difference arises in the amount of thermal expansion within a plate or a corrugated plate, big stress will occur in a plate and a corrugated plate, and it will become easy to generate *****.

[0004] Moreover, when the plate and the corrugated plate contain aluminum, nickel nickel and aluminum aluminum which were diffused combine and a nickel-aluminum alloy is generated. However, if this nickel-aluminum alloy is generated, the oxidation resistance of a plate and a corrugated plate will fall, and it will become easy to generate ***** . Thus, since it will become easy to generate a crack if a lot of nickel nickel is spread in a plate and a corrugated plate, in order to prevent occurrence of a crack, it is necessary to prevent that a lot of nickel nickel is spread in a plate and a corrugated plate. However, in the well-known metal support mentioned above, consideration is not paid to such ground for chemical at all to occurrence of a ***** crack, therefore there is a problem that a crack will occur based on such ground for chemical, by this well-known metal support.

[0005]

[Means for Solving the Problem] The honeycomb field of the shape of a cylinder which was acquired by ****ing a metal plate and a metal corrugated plate by turns in the shape of a said core according to this invention in order to solve the above-mentioned trouble, A wrap sheath is provided [the periphery of the honeycomb field] for the periphery of a wrap interval cylinder and an interval cylinder. While the soldering junction of the inner **** of an interval cylinder is carried out in the end section of an interval cylinder in the periphery side of the honeycomb field, in the other edges of an interval cylinder, the soldering junction of the periphery side of an interval cylinder is carried out at inner **** of a sheath. In the metal support for exhaust gas depuration catalysts which supported the catalyst on the honeycomb field, it curses between an interval cylinder and the honeycomb field, the amount of wax material per [in a joint] unit area is cursed between an interval cylinder and a sheath, and it is made fewer than the amount of wax material per [in a joint] unit area.

[0006]

[Function] It curses between an interval cylinder and the honeycomb field, and the amount of nickel nickel in the wax material which curses between an interval cylinder and the honeycomb field since there are few amounts of wax material per [in a joint] unit area than the amount of wax material per [in / it curses between an interval cylinder and a sheath and / a joint] unit area, and is diffused in the honeycomb inside of the body at the time of a junction becomes little.

[0007]

[Example] The honeycomb field of the shape of a cylinder acquired when 1 ****ed the metal plate 2 and the metal corrugated plate 3 by turns in the shape of a said core when the drawing 1 and the drawing 2 were referred to, 4 is arranged in **** with the honeycomb field 1, and a wrap metal interval cylinder and 5 are arranged in **** with the interval cylinder 4 in the periphery of the honeycomb field 1, and in a wrap metal sheath, the periphery of the interval cylinder 4 is shown, respectively and a catalyst is supported [periphery] on this honeycomb field 1. Although a clearance exists between the honeycomb field 1 and the interval cylinder 4 and between the interval cylinder 4 and the sheath 5 as shown in the drawing 1 and the drawing 2, these clearances are exaggerated and drawn in the drawing 1 and the drawing 2, and these clearances are quite parvus in fact. The plate 2 and the corrugated plate 3 are formed from the ferrite alloy containing aluminum, and the thickness of these plates 2 and the corrugated plate 3 is 50 micrometers or less.

On the other hand, the interval cylinder 4 has the thickness of about 0.5mm, and a sheath 5 has the thickness of about 1.5mm.

[0008] The contact section of a plate 2 and the corrugated plate 3 located outside a dashed line in drawing 1 is mutually joined by soldering. In drawing 1, arrow head X shows the direction of flow of the exhaust gas discharged from the engine, therefore will be joined mutually that I will sharpen corrugated plate 3 with a plate 2 only in the periphery section of the upper edge of the honeycomb field 1 and a down-stream edge, and the honeycomb field 1, in view of direction-of-flow X of exhaust gas.

[0009] On the other hand, as shown in drawing 3, the slit 6 of the masses prolonged in the orientation of an axis is formed in the down-stream side edge section of the interval cylinder 4 located in a lower-stream-of-a-river side, in view of direction-of-flow X of exhaust gas, and inner **** of the down-stream side edge section of the interval cylinder 4 by which these slits 6 were formed is joined by the periphery side of the down-stream side edge section of the honeycomb field 1 by soldering. On the other hand, the periphery side of the upper side edge section of the interval cylinder 4 is joined to inner **** of the upper side edge section of a sheath 5 by soldering. Therefore, as shown in drawing 1, between the periphery side of the down-stream side edge section of the honeycomb field 1, and inner **** of the down-stream side edge section of the interval cylinder 4, it sets in the orientation of an axis, and it is L1. The wax material layer 7 continued and prolonged to a length is formed. Between the periphery side of the upper side edge section of the interval cylinder 4, and inner **** of the upper side edge section of a sheath 5, it sets in the orientation of an axis, and it is L2. The wax material layer 8 continued and prolonged to a length is formed.

[0010] It is shown in drawing 1 -- as -- the orientation length L1 of an axis of the wax material layer 7. The orientation length L2 of an axis of the wax material layer 8 although it is long -- thickness t1 of the wax material layer 7 Thickness t2 of the wax material layer 8 It is quite thin. Therefore, the amount of wax material per unit area of the wax material layer 7 has become less than the amount of wax material per unit area of the wax material layer 8 considerably. Soldering work fills up with wax material the area which should form each wax material layers 7 and 8, and is performed by subsequently to 1200 degrees C or more heating the honeycomb field 1, the interval cylinder 4, and the whole sheath 5 in a vacuum. Thus, soldering work will be performed and nickel nickel in wax material is spread in the plate 2 and the corrugated plate 3 during work.

[0011] By the way, if a lot of nickel nickel is spread in the plate 2 and the corrugated plate 3 at this time as mentioned above, the plate 2 and the corrugated plate 3 will carry out an embrittlement, and, as a result, it will become easy to generate a crack in the plate 2 or the corrugated plate 3. Moreover, if a lot of nickel nickel is spread in the plate 2 and the corrugated plate 3, the coefficient of thermal expansion of the monotonous fraction which nickel nickel diffused, and a corrugated plate fraction will become large locally. between a monotonous fraction besides the result, and corrugated plate fractions -- the big level difference to coefficient of thermal expansion -- being generated -- the sake -- the big stress in the plate 2 and the corrugated plate 3 -- generating -- ***** -- monotonous -- it becomes easy to generate a crack in 2 or the corrugated plate 3

[0012] Moreover, nickel nickel and aluminum aluminum which were diffused when nickel nickel was spread in the plate 2 and the corrugated plate 3 in this way combine, and a nickel-aluminum alloy is generated. However, if this nickel-aluminum alloy is generated so much at this time, the oxidation resistance of the plate 2 and the corrugated plate 3 will fall, and it reaches ***** monotonous 2, and becomes easy to generate a crack in a corrugated plate 3. Thus, since it will become easy to generate a crack if a lot of nickel nickel is spread in the plate 2 and the corrugated plate 3, in order to prevent occurrence of a crack, it is necessary to prevent that a lot of nickel nickel is spread in the plate 2 and the corrugated plate 3. Then, in this invention, it is made to lessen the amount of wax material per unit area of the wax material layer 7. That is, the amount of nickel nickel diffused in the plate 2 and the corrugated plate 3 during soldering work is proportional to the amount of wax material per unit area. Therefore, it can prevent now that the amount of nickel nickel diffused in the plate 2 and the corrugated plate 3 will decrease if the amount of wax material per unit area is lessened, and reach ***** monotonous 2, and a crack occurs in a corrugated plate 3.

[0013] On the other hand, when the bonding strength between the honeycomb field 1 and the interval cylinder 4 is proportional to the amount of the whole wax material mostly, therefore the amount of wax material per unit area is lessened, in order for the bonding strength between the honeycomb field 1 and the interval cylinder 4 not to fall, it is necessary to make area of the wax material layer 7 large. Therefore, as shown to drawing 1 by the example by this invention, it is the orientation length L1 of an axis of the wax material layer 7. The orientation length L2 of an axis of the wax material layer 8 It lengthens.

[0014] If exhaust gas starts inflow in the honeycomb field 1, the temperature of the honeycomb field 1 will rise gradually and the direction of the temperature of the honeycomb field 1 will become higher than the temperature of the interval cylinder 4. Consequently, the periphery section of the honeycomb field 1 is buckled by thermal-expansion operation of the honeycomb field 1, and it deforms plastically. Subsequently, if operation of an engine is stopped, the temperature of the honeycomb field 1 will fall gradually and will contract the ***** honeycomb field 1 gradually. Since the periphery section of the honeycomb field 1 has been deformed plastically at this time, when it returns to the original temperature, the path of the honeycomb field 1 decreases a little. Therefore, the down-stream side edge section of the interval cylinder 4 is made to curve at this time by the inner direction.

[0015] Thus, if the down-stream side edge section of the interval cylinder 4 is made to curve by the inner direction, the bending moment will act on the interval cylinder 4. For making small the bending moment generated at this time, they are the wax material layer 7 and the clearance L0 between eight. It is necessary to take as greatly as possible. Therefore, the shaft-orientations length L1 of the wax material layer 7 It is a clearance L0, securing the firm combination between the honeycomb field 1 and the interval cylinder 4. It is determined that it enlarges as much as possible.

[0016] moreover, honeycomb field 1 fraction in which, as for honeycomb field 1 fraction in which the wax material layer 7 is not formed if the temperature of the honeycomb field 1 rises with exhaust gas heat, the wax material layer 7 is formed -- comparing -- thickness t1 of the wax material layer 7 only -- it is going to carry out thermal expansion In this case, thickness t1 of the wax material layer 7 The difference with the deformation of honeycomb field 1 fraction in which the deformation and the wax material layer 7 of honeycomb field 1 fraction in which the wax material layer 7 is not formed so that it is thick are formed becomes large. When an intumescence deflation operation of the ***** honeycomb field 1 is repeated, a crack will occur in the boundary section with honeycomb field 1 fraction in which honeycomb field 1 fraction in which the wax material layer 7 is not formed, and the wax material layer 7 are formed. However, at the example by this invention, it is the thickness t1 of the wax material layer 7. The difference with the deformation of honeycomb field 1 fraction in which the deformation and the wax material layer 7 of honeycomb field 1

fraction in which the wax material layer 7 is not formed since it is thin are formed becomes small. It can be prevented that a crack occurs in the boundary section with honeycomb field 1 fraction in which honeycomb field 1 fraction in which the ***** material layer 7 is not formed, and the wax material layer 7 are formed.

[0017]

[Effect of the Invention] It can prevent that a crack occurs on the honeycomb field, and the durability of ***** metal support can be improved in the ***** honeycomb field.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is side face sectional drawing of metal support.

[Drawing 2] It is sectional drawing which met the II-II line of drawing 1 .

[Drawing 3] a part of metal support which shows the appearance of an interval cylinder -- it is sectional drawing

[Description of Notations]

- 1 -- Honeycomb field
- 2 -- Monotonous
- 3 -- Corrugated plate
- 4 -- Interval cylinder
- 5 -- Sheath
- 7, 8 -- Wax material layer

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② 6

METAL CARRIER FOR EXHAUST GAS PURIFYING CATALYST

Patent Number: JP8294632
Publication date: 1996-11-12
Inventor(s): TAKADA TOSHIHIRO; IIDA SEIZO; TAKEI HISASHI
Applicant(s):: TOYOTA MOTOR CORP; CATALER KOGYO KK
Requested Patent: ☐ JP8294632
Application Number: JP19950103894 19950427
Priority Number(s):
IPC Classification: B01J35/04 ; B01J35/04 ; B01D53/86 ; F01N3/28 ; F01N3/28 ; F01N3/28
EC Classification:
Equivalents:

Abstract

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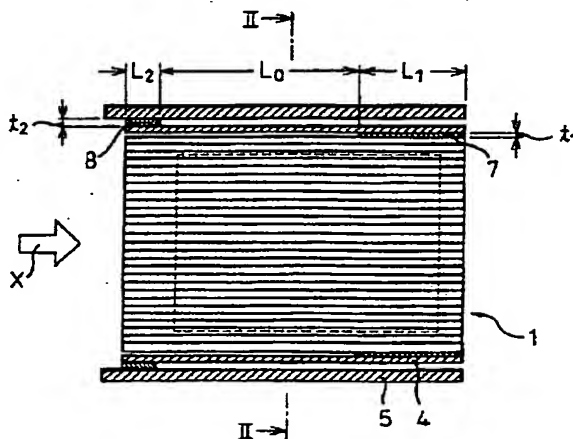
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(54) 【発明の名称】 排気ガス浄化触媒用メタル担体

(57) 【要約】

【目的】 ハニカム体に亀裂が発生するのを阻止する。

【構成】 金属製平板2と金属製波板3とを同心状に交互に巻設することによって得られた円筒状のハニカム体1と、ハニカム体1の外周を覆う中間筒4と、中間筒4の外周を覆う外筒5とを具備する。中間筒4の一端部の内周面をハニカム体1の外周面にろう付け接合すると共に中間筒4の他端部の外周面を外筒5の内周面にろう付け接合する。中間筒4とハニカム体1間のろう付け接合部7における単位面積当りのろう材量を中間筒4と外筒5間のろう付け接合部8における単位面積当りのろう材量よりも少なくする。



【特許請求の範囲】

【請求項1】 金属製平板と金属製波板とを同心状に交互に巻設することによって得られた円筒状のハニカム体と、ハニカム体の外周を覆う中間筒と、中間筒の外周を覆う外筒とを具備し、中間筒の一端部において中間筒の内周面をハニカム体の外周面にろう付け接合すると共に中間筒の他端部において中間筒の外周面を外筒の内周面にろう付け接合し、ハニカム体上において触媒を担持するようにした排気ガス浄化触媒用メタル担体において、中間筒とハニカム体間のろう付け接合部における単位面積当りのろう材量を中間筒と外筒間のろう付け接合部における単位面積当りのろう材量よりも少なくした排気ガス浄化触媒用メタル担体。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は排気ガス浄化触媒用メタル担体に関する。

【0002】

【従来の技術】 金属製平板と金属製波板とを同心状に交互に巻設することによって得られた円筒状のハニカム体と、ハニカム体の外周を覆う中間筒と、中間筒の外周を覆う外筒とを具備し、中間筒の一端部において中間筒の内周面をハニカム体の外周面にろう付け接合すると共に中間筒の他端部において中間筒の外周面を外筒の内周面にろう付け接合し、ハニカム体上において触媒を担持するようにした排気ガス浄化触媒用メタル担体が公知である（特開平5-57197号公報参照）。このメタル担体では熱膨張作用および収縮作用によりハニカム体の径が変化したときに中間筒が変形してハニカム体の径の変化を吸収し、それによりハニカム体に局所的に大きな応力が発生するのを阻止してハニカム体に亀裂が発生するのを防止するようにしている。

【0003】

【発明が解決しようとする課題】 しかしながらハニカム体に亀裂が発生するのは構造上大きな応力が発生してしまうという物理的理由に基づくばかりでなく、ろう材によりハニカム体が化学変化を受けてしまい、その結果亀裂が発生するという化学的理由にも基づいている。即ち、中間筒とハニカム体間をろう付け接合するために中間筒およびハニカム体を高温に加熱するとうろう材中のニッケルNiがハニカム体を構成する平板および波板内に拡散する。ところがこのとき多量のニッケルNiが平板および波板内に拡散すると平板および波板が脆化し、その結果亀裂が発生しやすくなる。また、多量のニッケルNiが平板および波板内に拡散するとニッケルNiが拡散した平板部分および波板部分の熱膨張率が局所的に大きくなり、その結果他の平板部分および波板部分との間で熱膨張量に大きな段差が生じるようになる。このように平板内又は波板内で熱膨張量に差が生じると平板および波板内には大きな応力が発生し、斯くして亀裂が発生

しやすくなる。

【0004】 また、平板および波板がアルミを含有している場合には拡散したニッケルNiとアルミAlとが化合してNi-Al合金が生成される。ところがこのNi-Al合金が生成されると平板および波板の耐酸化性が低下し、斯くして亀裂が発生しやすくなる。このように多量のニッケルNiが平板および波板内に拡散すると亀裂が発生しやすくなるので亀裂の発生を阻止するためには多量のニッケルNiが平板および波板内に拡散するのを阻止する必要がある。しかしながら前述した公知のメタル担体ではこのような化学的理由に基づく亀裂の発生に対して何ら考慮が払われておらず、従ってこの公知のメタル担体ではこのような化学的理由に基づいて亀裂が発生してしまうという問題がある。

【0005】

【課題を解決するための手段】 上記問題点を解決するために本発明によれば、金属製平板と金属製波板とを同心状に交互に巻設することによって得られた円筒状のハニカム体と、ハニカム体の外周を覆う中間筒と、中間筒の外周を覆う外筒とを具備し、中間筒の一端部において中間筒の内周面をハニカム体の外周面にろう付け接合すると共に中間筒の他端部において中間筒の外周面を外筒の内周面にろう付け接合し、ハニカム体上において触媒を担持するようにした排気ガス浄化触媒用メタル担体において、中間筒とハニカム体間のろう付け接合部における単位面積当りのろう材量を中間筒と外筒間のろう付け接合部における単位面積当りのろう材量よりも少なくしている。

【0006】

【作用】 中間筒とハニカム体間のろう付け接合部における単位面積当りのろう材量が中間筒と外筒間のろう付け接合部における単位面積当りのろう材量よりも少ないので中間筒とハニカム体間のろう付け接合時にハニカム体内に拡散するろう材中のニッケルNiの量は少量となる。

【0007】

【実施例】 図1および図2を参照すると、1は金属製平板2と金属製波板3とを同心状に交互に巻設することによって得られた円筒状のハニカム体、4はハニカム体1と共軸的に配置されかつハニカム体1の外周を覆う金属製中間筒、5は中間筒4と共軸的に配置されかつ中間筒4の外周を覆う金属製外筒を夫々示し、このハニカム体1上において触媒が担持される。図1および図2に示されるようにハニカム体1と中間筒4の間、および中間筒4と外筒5の間には間隙が存在するが図1および図2ではこれら間隙は誇張して描かれており、実際にはこれら間隙はかなり小さい。平板2および波板3はアルミニウムを含有したフェライト合金から形成されており、これら平板2および波板3の厚みは50μm以下である。これに対して中間筒4は0.5mm程度の肉厚を有し、外筒

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5は1.5mm程度の肉厚を有する。

【0008】図1において破線よりも外側に位置する平板2と波板3の接触部はろう付けにより互いに接合されている。図1において矢印Xは機関から排出された排気ガスの流れ方向を示しており、従って排気ガスの流れ方向Xからみてハニカム体1の上流端および下流端とハニカム体1の外周部のみにおいて平板2と波板3とがろう付けにより互いに接合されていることになる。

【0009】一方、図3に示されるように排気ガスの流れ方向Xからみて下流側に位置する中間筒4の下流側端部には軸線方向に延びる多数のスリット6が形成されており、これらスリット6が形成された中間筒4の下流側端部の内周面はろう付けによりハニカム体1の下流側端部の外周面に接合されている。一方、中間筒4の上流側端部の外周面はろう付けにより外筒5の上流側端部の内周面に接合されている。従って図1に示されるようにハニカム体1の下流側端部の外周面と中間筒4の下流側端部の内周面間には軸線方向において L_1 の長さ亘って延びるろう材層7が形成され、中間筒4の上流側端部の外周面と外筒5の上流側端部の内周面間には軸線方向において L_2 の長さ亘って延びるろう材層8が形成される。

【0010】図1に示されるようにろう材層7の軸線方向長さ L_1 はろう材層8の軸線方向長さ L_2 よりも長い。ろう材層7の厚み t_1 はろう材層8の厚み t_2 よりもかなり薄くなっている。従ってろう材層7の単位面積当りのろう材量はろう材層8の単位面積当りのろう材量よりもかなり少なくなっている。ろう付け作業は各ろう材層7、8を形成すべき領域にろう材を充填し、次いでハニカム体1、中間筒4および外筒5の全体を真空中で200℃以上に加熱することによって行われる。このようにしてろう付け作業を行うとろう付け作業中にろう材中のニッケルNiが平板2および波板3内に拡散する。

【0011】ところで前述したようにこのとき多量のニッケルNiが平板2および波板3内に拡散すると平板2および波板3が脆化し、その結果平板2又は波板3に亀裂が発生しやすくなる。また多量のニッケルNiが平板2および波板3内に拡散するとニッケルNiが拡散した平板部分および波板部分の熱膨張率が局所的に大きくなる。その結果他の平板部分および波板部分との間で熱膨張率に大きな段差が生じ、そのために平板2および波板3内には大きな応力が発生し、斯くして平板2又は波板3に亀裂が発生しやすくなる。

【0012】また、このようにニッケルNiが平板2および波板3内に拡散すると拡散したニッケルNiとアルミAlとが化合してNi-Al合金が生成される。ところがこのときこのNi-Al合金が多量に生成されると平板2および波板3の耐酸化性が低下し、斯くして平板2および波板3に亀裂が発生しやすくなる。このように多量のニッケルNiが平板2および波板3内に拡散する

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と亀裂が発生しやすくなるので亀裂の発生を阻止するためには多量のニッケルNiが平板2および波板3内に拡散するのを阻止する必要がある。そこで本発明ではろう材層7の単位面積当りのろう材量を少なくするようにしている。即ち、ろう付け作業中に平板2および波板3内に拡散するニッケルNiの量は単位面積当りのろう材量に比例している。従って単位面積当りのろう材量を少なくすれば平板2および波板3内に拡散するニッケルNiの量は少なくなり、斯くして平板2および波板3に亀裂が発生するのを阻止することができるようになる。

【0013】一方、ハニカム体1と中間筒4間の接合強度はほぼろう材全体の量に比例しており、従って単位面積当りのろう材量を少なくした場合においてもハニカム体1と中間筒4間の接合強度が低下しないようにするためにはろう材層7の面積を広くすることが必要となる。従って本発明による実施例では図1に示されるようにろう材層7の軸線方向長さ L_1 はろう材層8の軸線方向長さ L_2 よりも長くされている。

【0014】ハニカム体1内に排気ガスが流入を開始するとハニカム体1の温度が徐々に上昇し、ハニカム体1の温度の方が中間筒4の温度よりも高くなる。その結果、ハニカム体1の熱膨張作用によりハニカム体1の外周部は座屈して塑性変形する。次いで機関の運転が停止されるとハニカム体1の温度が徐々に低下し、斯くしてハニカム体1は徐々に収縮する。このときハニカム体1の外周部は塑性変形したままであるので元の温度に戻ったときにハニカム体1の径は若干減少する。従ってこのとき中間筒4の下流側端部は内方に湾曲せしめられる。

【0015】このように中間筒4の下流側端部が内方に湾曲せしめられると中間筒4には曲げモーメントが作用する。このとき発生する曲げモーメントを小さくするにはろう材層7、8間の間隙 L_3 をできるだけ大きく取ることが必要となる。従ってろう材層7の軸方向長さ L_1 はハニカム体1と中間筒4間の強固な結合を確保しつつ間隙 L_3 をできるだけ大きくするように定められている。

【0016】また、排気ガス熱によりハニカム体1の温度が上昇するとろう材層7が形成されていないハニカム体1部分はろう材層7が形成されているハニカム体1部分に比べてろう材層7の厚み t_1 だけ熱膨張しようとする。この場合、ろう材層7の厚み t_1 が厚いほどろう材層7が形成されていないハニカム体1部分の変形量とろう材層7が形成されているハニカム体1部分の変形量との差が大きくなり、斯くしてハニカム体1の膨張収縮作用が繰返されるとろう材層7が形成されていないハニカム体1部分とろう材層7が形成されているハニカム体1部分との境界部において亀裂が発生することになる。しかしながら本発明による実施例ではろう材層7の厚み t_1 が薄いのでろう材層7が形成されていないハニカム体1部分の変形量とろう材層7が形成されているハニカム

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体1部分の変形量との差が小さくなり、斯くしてろう材層7が形成されていないハニカム体1部分とろう材層7が形成されているハニカム体1部分との境界部において亀裂が発生するのを阻止することができることになる。

【0017】

【発明の効果】ハニカム体に亀裂が発生するのを阻止することができ、斯くしてハニカム体を具えたメタル担体の耐久性を向上することができる。

【図面の簡単な説明】

【図1】メタル担体の側面断面図である。

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【図2】図1のII-II線に沿って見た断面図である。

【図3】中間筒の外観を示すメタル担体の一部断面図である。

【符号の説明】

1…ハニカム体

2…平板

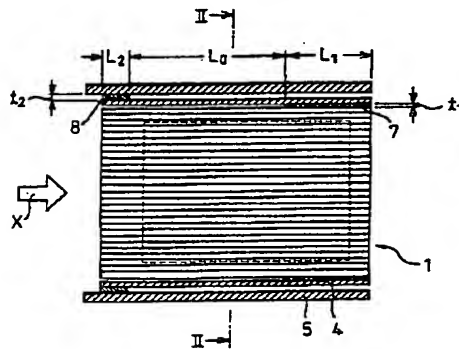
3…波板

4…中間筒

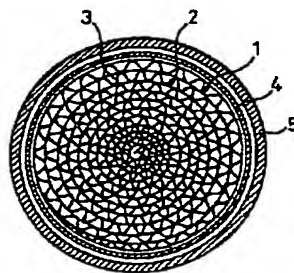
5…外筒

10 7, 8…ろう材層

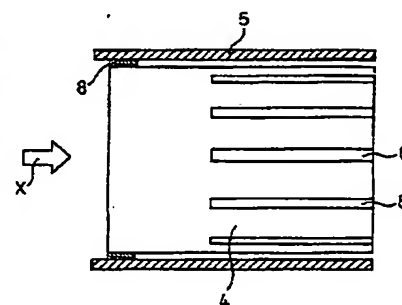
【図1】



【図2】



【図3】



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